

DETAILED ACTION

Response to Amendment

1. Applicant's amendment of claim 1 is acknowledged and has been entered.
2. Applicant's cancellation of claim 10 is acknowledged and has been entered.
3. Claims 1, 2, 5-13, 28, and 29 are currently pending.
4. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

5. Applicant's arguments, see p. 6-10, filed February 21, 2008, with respect to the rejection of claims 1-9, 11-13 under 35 U.S.C. 103(a) as being unpatentable over Andrews [US 5,225,163] in view of Burdon et al. [US 6,572,830] and further in view of Bergh et al. [US 2002/0045265] have been fully considered and are persuasive. The rejection of claims 1-9, 11-13 under 35 U.S.C. 103(a) as being unpatentable over Andrews [US 5,225,163] in view of Burdon et al. [US 6,572,830] and further in view of Bergh et al. [US 2002/0045265] has been withdrawn.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 1-9, 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews [US 5,225,163] in view of Strand et al. [US 2002/0176804] and further in view of Bergh et al. [US 2002/0045265].

With respect to claim 1, Andrews teaches the invention substantially as claimed because Andrews teaches two chambers with inlets in the two chambers (see figure 3). Andrews further teach reagents (analyzing elements) (column 7, lines 30-35), magnets for magnetic capture (analyzing elements) (column 7, lines 5-10), and viewing chambers for visual inspection (column 31-35), which would assist in the analysis and detection of analytes in the sample. However, Andrews does not teach that the two chambers are formed by three units or that the first and second analyzing elements are replaceable from the first and second chambers respectively.

However Strand et al. disclose that chambers and channels that can be formed by the interface of two substrate layers (para. 0060), such that a chamber is formed between a first layer and a second layer and a second chamber formed between the second layer and a third layer (fig. 1A). Strand et al. further teach multiple bolts extending through plates sandwiching the layers together (para. 0013). Strand et al. further teach that this provides a cost-effective means of manufacture of high precision devices (para. 0010). Strand et al. further teach sensors located within the chambers for detecting different properties (para. 0042)

Furthermore, Bergh et al. teach modular fluidic chips that comprise detectors (para. 0109) that can be mounted fixedly or detachably on a substrate (para. 0011).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the Andrews chambers using different units sealed together to form a chamber as taught by Strand et al. because Strand et al. teach that a chamber can be formed by

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different layers that are bolted together. Strand et al. further provides motivation for producing the invention of Andres using different layers as Strand et al. teach that this is a cost-effective means of manufacture of high precision devices while being able to detect various different properties of the analytes and fluids within the chamber. Bergh et al. further shows that fixed and detachable detectors are equivalent structures known in the art. Therefore, because these two detectors were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art at the time of the invention would have found it obvious to substitute a detachable chip for a fixed chip in the invention of Andrews.

8. With respect to claim 2, Andrews teaches an angled channel segment (36) which delivers reaction fluids into another chamber (38), (col. 7, lines 1-5). Andrews teaches that this angled channel segment (36) provides an isolated area in which to place a magnet for magnetic capture of reaction products (col. 7, lines 5-7, and see figure 3). (Andrews also discloses another embodiment (see figure 7) in which an angled channel is disclosed in general.) The angled channel segment (36) is deemed to be Applicants' claimed pipeline. It is noted that with the modification of the Andrews invention as taught by Burdon et al. as discussed above, the modification results in the angled channel segment (36) being in the second unit and because the angled channel segment (36) is connected to both chambers (33) and (38), the angled channel segment (36) is sequentially connected to the fluid inlet, first lower portion, second upper portion and fluid outlet with an inclined angle, as claimed by Applicant.

9. With respect to claims 5, 6, Strand et al. teach leads for connecting components in the chambers to an external memory unit (para. 0014), such as sensors (para. 0042).

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10. With respect to claim 7, Andrews teaches the use of reagents (column 7, lines 30-35) which would be biological or chemical sensing elements for antigen-antibody specific binding assays (column 7, lines 13-15).
11. With respect to claims 8, 13 Andrews teaches viewing chambers, which are optical sensing elements, for visual inspection (column 31-35) of the reaction products, from the reagents in the first chamber.
12. With respect to claim 9, Andrews teaches the use of reagents (column 7, lines 30-35) which would be biological or chemical sensing elements for antigen-antibody specific binding assays (column 7, lines 13-15).
13. With respect to claim 11, Andrews teaches that the device may comprise acrylic (column 8, lines (column 8, lines 56-63)).
14. With respect to claim 12, Strand et al. teach pumps mounted aboard the multi-layer substrate (para. 0011).
15. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews [US 5,225,163] in view of Strand et al. [US 2002/0176804] and Bergh et al. [US 2002/0045265] and further in view of Tai et al. [US 2002/0093143].

With respect to claims 28, 29, Andrews teaches the invention substantially as claimed because Andrews teaches two chambers with inlets in the two chambers (see figure 3). Andrews further teach reagents (analyzing elements) (column 7, lines 30-35), magnets for magnetic capture (analyzing elements) (column 7, lines 5-10), and viewing chambers for visual inspection (column 31-35), which would assist in the analysis and detection of analytes in the sample.

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However, Andrews does not teach that a first and second sealing element are disposed between the units, as recited by applicants.

Tai et al., however, teach the use of O-rings between layers in microfluidic systems, and teach that they allow for a high coupling force which is strong enough to withstand high pressure, but yet does not require glue or mechanical clamping (para. 0007).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used O-rings between the different units, as suggested by Tai et al., in order to seal the device and prevent leaking, while avoiding the use of more complicated and irreversible techniques, such as clamping, gluing, or sintering.

Response to Arguments

16. Applicant's arguments with respect to claims 1, 2, 5-13, 28, 29 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

17. No claims are allowed.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson Yang whose telephone number is (571) 272-0826. The examiner can normally be reached on 8:30-5:00.

19. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long V. Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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20. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nelson Yang/
Patent Examiner, Art Unit 1641